

Amendment of the Claims

1. (Currently Amended) A pre-treatment process for solid lump feed material for a gas and pellet/lump-based shaft furnace direct reduction process, comprising:

preheating and predrying hematite lump feed material to a temperature of from about 200° C to less than or equal to 500° C ~~500° C~~, without reduction, in a non-reducing atmosphere prior to charging the feed material to gas-based direct reduction furnace;

transporting the lump feed material through an insulated charging system having either an inert or oxidizing atmosphere;

charging the feed material from the insulated charging system to the furnace; and

increasing the temperature of the pre-heated feed material within the furnace from the material introduction temperature to about 750° C within the first 20 minutes of charging the feed material into the furnace;

whereby the formation of fines within the furnace is minimized.

2. (Previously Presented) A process according to claim 1, wherein the feed material is pre-heated to a temperature of about 200° C to 425° C.

3. (Previously Presented) A process according to claim 1, wherein said preheating is accomplished in a feed storage bin by introduction of waste off-gases at a sufficient temperature to heat the feed material in the storage bin.

4. (Previously Presented) A process according to claim 3 wherein the waste off-gas temperature is in excess of 500° C upon introduction into the feed storage bin.

5. (Original) A process according to claim 3, wherein said waste off-gases are removed from a reformer associated with the direct reduction process.

6. (Canceled)

7. (Canceled)

8. (Currently Amended) A pre-treatment process for solid lump feed material for a gas and pellet/lump-based shaft furnace direct reduction process comprising:

preheating and predrying hematite lump feed material to a temperature of from about 200° C to less than or equal to 500° C ~~500° C~~, without reduction, in a non-reducing atmosphere prior to charging the feed material to gas-based direct reduction furnace;

transporting the lump feed material through an insulated charging system having either an inert or oxidizing atmosphere;

charging the feed material from the insulated charging system to the furnace; and

increasing the temperature of the preheated feed material within the furnace from the material introduction temperature of less than or equal to 500° C to about 750° C in less than 20 minutes while the feed material descends the first half meter in the furnace after introduction of the feed material into the moving bed of the furnace;

whereby the formation of fines within the furnace is minimized.